

Instructions to Moderators

Chemistry I.A. May 2009

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Dear Moderators,

Thank you for offering your services yet again for vital task of I.A. Moderation. This is the first session under the new criteria and six point scale. Also excitingly I.A. has entered the electronic mark entering age and this should make sample selection more appropriate. So there are many changes to contend with although hopefully the online training will have helped us get up to speed.

Despite the changes our key principles have remained the same:

1. **Support the teacher wherever possible:** We are not primary marking and if the teachers grading is a plausible interpretation of the criteria then it should be supported. Remember: we are not imposing our own particular standard of marking, as used in our own classes, on others. Always check to see that the teachers have not made a reasonable interpretation of the Subject Guide before marking up or down
2. **'Complete' does not mean perfection:** You may find yourself supporting 'p' or 'c' for very similar levels of response when different teachers apply the gradual boundary between c and p differently. Try to **give credit for what the student has achieved not to simply punish one omission.**
3. Mark the report as a whole. Students are under no obligation to write up their report according to the criteria headings and evidence for the aspects could be in a very different sequence.
4. **Keep marking with the same care and attention throughout your allocation:** Do not ease up once you have dispatched your sample to your team leader. Remember that schools can demand the IMR report after the grades are issued and all school samples could be subject to re-marking by a senior moderator. **Annotate on the scripts with c, p, n notation and possibly further comment at the point where you decide to award a level. Initial your comments so that they can be distinguished from the teacher's.**

So the broad message is be positive in your marking. Look for what is present in a piece of work and not for minor omissions. Try to avoid pettiness and remember that sometimes you can even mark upwards.

Good luck!

The essential reading for moderation are the Criteria and the all important Clarifications to the Criteria in the Subject Guide. Also the TSM exemplars are useful to check through. I do not want to add too many more instructions since we could find ourselves working to contradictory information. However below are some further practical tips and guidelines to follow:

DESIGN

If all students are using identical methods then mark as normal and contact Examination Administration Officer (EAO). Probably will be requested to file Problem Report Form (PRF).

Design Aspect 1

- Aspect 1 is really a two part aspect (R.Q. and then Variables). Complete for both parts then gets 2 marks, cp, pp, and p,n would all get 1 mark (a broad band admittedly) and (n,n will get zero).
- If a teacher has supplied the Research Question then this nullifies the first half of the criterion. However if they have satisfied the second half partially (e.g. by correctly identifying a good number of control variables) then maybe Partial can be awarded overall for Aspect 1.
- If the teacher has specified independent and control variables then the second half of aspect is nullified automatically. It could be felt that it has also completely focussed the research question so the final Aspect1 award could well be Not at All
- If the teacher has identified just the independent or just a control variable then Partial can still be awarded.
- The teacher is allowed to specify the Dependent Variable when setting the task.

When not to mark down in Design Aspect 1.

- The independent and controlled variables have been clearly identified in procedure but are not given as a separate list (we mark the whole report and there is no obligation to write up according to the aspect headings)

Design Aspect 2

- This Aspect does demand that the students clearly describe the procedure to be followed including the materials to be used. The materials could be in list form or embedded in a step-wise description of procedure. If the procedure lacks sufficient detail, so that it could not be followed by the reader in order to reproduce the experiment, the maximum award is Partial.
- Students need to make a description of sizes of apparatus (eg. A 250 cm³ volumetric flask) and concentration of solutions but not the precision because that is assessed in effect in DCP Aspect 1 in the raw data uncertainties.
- If a teacher has given students the full procedure then award Not at All.
- If a teacher has given a partial procedure then see what can be awarded for the student's own contribution. Probable award here is Partial.
- If a student has used a partial method from another source then that source should be acknowledged. Once again see what can be awarded for the student's own contribution. If a student has completely taken a Design from another source then the Award is Not at All even if the source is acknowledged. (In other disciplines you would not be credited for solely quoting someone else's work, acknowledge or not).

When not to mark down in Design Aspect 2

- 1379
- Similar (not word for word identical!) procedures are given for a narrow task. Comment though on poor suitability of task on 4/IAF form.
 - Do not only mark the equipment list. Give credit for equipment clearly identified in a stepwise procedure. Remember we mark the whole report.
 - Do not insist on the +/- precision of apparatus to be given in an apparatus list. This has never been specified to teachers and the concept of recording uncertainties is dealt with in DCP.
 - Do not downgrade a teacher's mark if something as routine as safety glasses or lab coats are not listed. Some teachers consider it vital to list them each time and some teachers consider them such an integral part of all lab work that they go without saying. Support teacher's stance.

Design Aspect 3

This Aspect assesses how much appropriate data is **designed** for, even if the student is then unable to follow it up exactly in the laboratory.

- If the student has designed procedure so poorly that you feel that no relevant data would be collected then award Not at All.

- If the student has planned for less than five data points (if a graph is to be produced) or has not planned for any repeats in quantitative determinations (e.g. titrations or calorimetry, etc then award Partial.

DATA COLLECTION AND PROCESSING

This criterion should be assessed through investigations that are essentially quantitative, either calculation and/or graph based. If a purely qualitative investigation has been assessed for DCP then the maximum award would be probably p, n, n = 1.

DCP Aspect 1

This aspect refers to the written record of raw data not the manipulation of the equipment needed to generate it (that is assessed in Manipulative Skills). Do not mark down if the teacher has given a detailed step by step procedural instructions (this may have been marked down in Design Aspect 3 if it is a Design assessment task. Not in DCP though).

- If a photocopied table is provided with heading and units that is filled in by students then the maximum the moderator can give is n = 0.
- If the student has only recorded quantitative data (e.g. colour changes in titration, observation of soot due to incomplete combustion in calorimetry, residual solid left in a beaker when reaction has excess solid reactant, bubbles being released when a gaseous product is formed) are missing then the moderator gives partial.
- However, do not be overzealous and penalize Aspect 1 every time a student does not find qualitative data to record. Sometimes there is no obviously relevant qualitative data to record.
- If a student has not recorded uncertainties in any quantitative data then maximum award is Partial.
- If the data is *repeatedly* to an inconsistent number of decimal places or in disagreement with the stated precision then Complete cannot be awarded. Be sensible and support teacher if there is just one single slip in a large body of data where all the rest is consistent with each other and the stated uncertainty.
- In tasks such as establishing a reactivity series, too often the students put in a reaction equation as opposed to the observation. This cannot be supported and will reduce first aspect to 'p' or 'n' depending on how much other raw data is present.

When not to mark down in DCP Aspect 1

- When the student has not included any qualitative observations and you cannot think of any that would have been obviously relevant.
- If in a comprehensive data collection exercise possibly with several tables of data the student has been inconsistent with significant digits for just one data point or missed units out of one column heading. If you feel the student has demonstrated that they were paying attention to these points and made one careless slip then you can still support maximum mark under 'complete not meaning perfection' rule. This is an important principle since often **good students responding in full to an extended task unfairly get penalised more often than students addressing a simplistic exercise.**
- When there is no table title when it is obvious what the data in the table refers to. I have seen students do all the hard work and then lose a mark from the moderator because they did not title the table. Except for extended investigations it is normally self evident what the table refers to and the section heading Raw Data is sufficient. Once again 'c' does not mean perfect.

DCP Aspect 2

If a teacher has given the method of calculation or told the students which quantities to plot then award Not at All.

- If a student has made an error in a calculation leading to the wrong determined quantity then the award may be Partial or Not at All depending on the severity of the error.
- If a graph with axes already labelled is provided (or students have been told which variables to plot) or the students have followed structured questions in order to carry out data processing then the moderator should award Not at All.
- If a student has simply plotted raw data on axes with no trendline then award Not at All.

DCP Aspect 3

- If you cannot easily determine the student's method of processing then award Partial at maximum.
- The student must report any final quantitatively determined quantity to a number of significant figures that is consistent with the precision of the input data. Failure to do so will reduce maximum award to partial.
- Do not punish inconsistent significant figures reported in the middle of a stepwise calculation if the final answer(s) is reported appropriately.

- If no evidence of errors being propagated being propagated through a calculation the award Partial at best. Remember that best fit line graph is sufficient to meet requirement for error and uncertainty propagation.
- The error propagation should be correctly followed through to a reasonable extent according to either the Subject Guides protocol or another accepted protocol. Try to support teacher if the student has made a sincere attempt even if there is a small flaw.

When not to mark down DCP Aspect 3

- Do not punish inconsistent significant figures reported in the middle of a stepwise calculation if the final answer(s) is reported appropriately.
- If the student has clearly attempted to propagate uncertainties then support a teacher's award even if you may feel that the student could have made a more sophisticated effort. Please **do not** punish a teacher or student if the protocol is not the one that you teach i.e. top pan balance uncertainties have given as $\pm 0.01\text{g}$ when you may feel that if we consider the tare weighing then it should be doubled.

Conclusion & Evaluation:

If structured questions are given to prompt students through the discussion, conclusion and criticism then, depending on how focussed the teacher's questions are and on the quality of students' response the maximum award is *partial* for each aspect the student has been guided through. You have to be judging purely on the students input.

CE Aspect 1.

- This is another multiple Aspect. The conclusion can take many forms depending on the nature of the investigation. It could be a clear restatement of the determined numerical quantity (e.g. the molar mass or activation energy) , a statement of the relationship found, etc. Such a clear statement earns Partial. To secure Complete the student must comment on systematic/random error and where appropriate relate to literature value. The comment on systematic/random error may well come after the sources of error have been discussed. This is fine.

CE Aspect 2

- Look to see that a student has identified the major sources of error. There will always be other possible sources but I do not want to force students into overly long lists of trivial points just so that they feel they have covered the options. I am concerned at the number of twenty page reports that we are increasingly seeing from diligent students that could have been condensed into a quarter of the length.
- There is no written requirement to state direction of each source error so we are not looking for an explicit statement. However the student's comments on significance of sources of error must be CONSISTENT with direction of error. e.g. Heat loss to environment is considered main source of error when experimentally determined enthalpy value is actually greater in magnitude than the literature and therefore implying another more major source of error in the other direction. This inconsistency would reduce aspect award to Partial.

When not to mark down CE Aspect 2

- Simply apply the principle of complete not meaning perfect. For example if the students have identified most sensible sources of systematic error the you can support a teacher's award even if you think that you can identify one more. Do however be a bit more critical in third aspect that the modifications are actually relating to the cited sources of error.

CE ASPECT 3

- It is important that the suggested modifications be realistic and should relate in the main to the weaknesses. Be sensible. If the student has cited five weaknesses and come up with good suggestions for modification to address four of them (and the fifth one has no modification readily accessible to a IB student) then Complete can be awarded.

Other Issues:

(A) Simplicity

If you feel a task was too simple to truly meet the spirit of the criteria then comment on the 4IAF as to the unsuitability of the task giving full justifications but do not necessarily downgrade the student. Yes, this does mean that students could get high DCP marks for some quite brief work on limited data but if they

have fulfilled the aspect's requirements within this small range then support the grade.

(B) Data logging

We are trying to encourage the use of data logging even in assessed work. The key axiom to be followed is that the students are to be assessed on their individual contribution to the assessed task. To judge this we have to be guided by the teacher who knows exactly what the students had to do. Apply the normal standards regarding expectations of data presentation (units, uncertainties, etc.) and graphs (best fit lines, axes labels, suitable scales, etc.).

If you are concerned as to whether the students have had sufficient input feedback to the teacher. I have some recommended phrases below.

Recommended Feedback Comment 1.

"The use of ICT in assessed investigations is acceptable and encouraged. The key axiom to be followed is that the students are to be assessed on their individual contribution to the assessed task and it should be ensured that they have sufficient input into the task."

Recommended Feedback Comment 2

"In order to ensure that students have sufficient opportunity to demonstrate their individual contribution to DCP a recommended strategy is to assess DCP when there is a further component to the data processing phase beyond that carried out using the data logger's graphing software."

D) When to Contact IBCA: Barry Evans: barry.evans@ibo.org

- When samples have not arrived by one or two days past the deadline of 20th April.
- When samples do not contain:
 - all flagged work,
 - 4PSOW's that flag two highest grades per criterion,
 - teacher's instructions for flagged investigation,
 - evidence of participation in Group 4 Project.
 - The new cover sheet signed by the teacher.

Check through samples for the above as they arrive so that IBCA have time to contact school and get further evidence sent out.

- When co-authored report has been submit as flagged work for re-marking.
- When you see evidence of complete or partial collusion i.e. word-for-word identical paragraphs in two reports.

These last two are very serious and may require a Problem Report Form (PRF) to be filled in.

F) The 4/IAF Feedback Form

The 4/IAF feedback form is vital in terms of motivating teachers to meet IB expectations in IA. There are concerns that our feedback is inconsistent (remember you should read last year's feedback on Examnet before writing this year's) and that it does not help explain downgrades. Unfortunately we cannot directly comment on standard of marking since we can also be moderated down.

Remember that all 4/IAF forms get read and edited before dispatch. I do a large proportion and although the majority are good there are some that need extensive editing owing to:

- Unduly negative or sarcastic tone (too heavy use of exclamation marks give the second effect).
- Misinterpretations of the regulations (for example: stating that two independent variables need to be selected for Design or saying that it is suspicious that all marks were generated from just 6 labs not the full 40. In reality it is permissible to just carry out two comprehensive assessed tasks in two years.)
- Promoting a methodology that goes beyond the IB requirements (last year it was promoted by one moderator that teachers should give prescribed procedures with deliberate faults so that students would have some errors to evaluate).
- Too short i.e. no comment at all. A positive comment in the Additional Comments box is welcome.
- Too long. You do not have to fill every box completely if there is nothing else to say!!!
- Writing in section A unnecessarily. This section should only be used for its stated purpose of describing unsuitable investigations.

Generic Feedback Statements:

From IBCA

Section A

Investigation X seems to be more suitable for (specify) Design/DCp/CE.

Full marks cannot be awarded if too much information is provided by the teacher.

For PI (a), if a general question or problem is provided by the teacher, credit can only be achieved for the first aspect if a candidate clarifies or focuses the general

question/problem.

Open-ended questions facilitate assessment of Design

DCP Aspect 1 cannot be assessed if the students have been told how to record the data.

DCP Aspect 1 involves the collection of raw data.

DCP Aspect 1 involves the collection of quantitative and where relevant qualitative data.

DCP Aspects 2 and 3 cannot be assessed if the students have been told how to analyse the data.

For CE, students must suggest modifications to the procedure.

B1

There appears to be some discrepancy between the hours stated on form 4/PSOW and

the time reasonably required to carry out the practical scheme of work.

Investigations should be carried out throughout the course, not just at the beginning/middle/end of the course.

The hours should not include time allocated for the write-up of investigations.

Only 2–3 hours of investigative work can be carried out after the submission date and count towards the total hours.

B2

There is no evidence on form 4/PSOW:

- of any investigations on the core
- of any investigations on the AHL material for the HL candidates
- of any investigations in the options studied

Investigations cover a wide range of topics.

B3

The practical scheme of work must allow for sufficient “hands on” investigative work.

The practical scheme of work must allow a full range of practical skills to be developed.

More challenging investigations are needed.

This appears to be an excellent/very good/good practical scheme of work in terms of breadth and depth.

The practical scheme of work is comprehensive and challenging.

Refer to the Online Curriculum Center (Chemistry Teacher Support Material 1 & 2) for its support material on suitable experimental activities and the examples of marked students' work, which are especially helpful.

C1

A form 4/PSOW should have been submitted for each candidate in the sample.

The school code was omitted.

The school name was omitted.

The candidate name(s) was/were omitted.

*only one option
Total not shown*

The candidate number(s) was/were omitted.
The dates of the investigations were omitted.
Outlines of the investigations were omitted.
Details of the topics/options corresponding to the investigations were omitted.
The duration of each investigation was omitted.
The name(s) of the teacher(s) was/were omitted.
The signature(s) of the teacher(s) was/were omitted.

C2

The two highest levels were not circled/highlighted for each of Design, DCP and CE on each form 4/PSOW.

Other Comments:

Evidence of individual contribution to the Group 4 Project must be sent for all candidates in the sample.

The feedback using c,p,n notation was helpful for students and moderators.

The well organised samples made moderation easier.

The research question was given which denied opportunity for students to fulfil first aspect for themselves

✓ Too narrow a task so students did not have opportunity to identify own research question or to identify variables for themselves.

(For DCP) Only qualitative data were collected so there was little opportunity for students to process data. The interpretation of results was more applicable to assessment by the first aspect of CE.

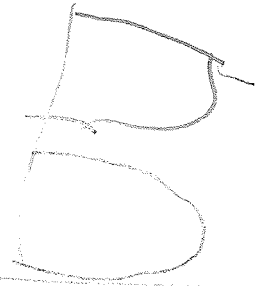
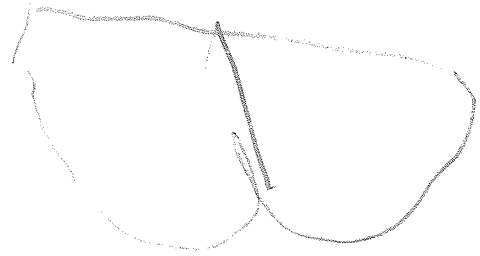
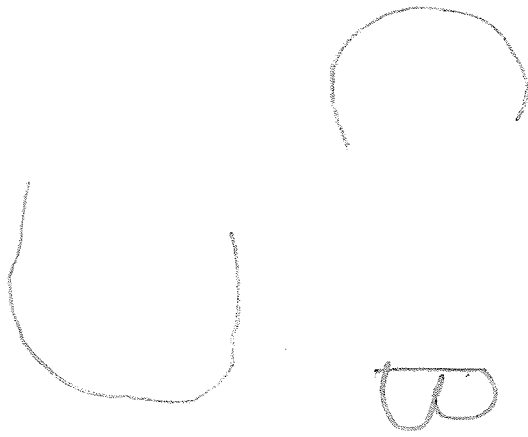
Feedback using c,p,n notation would be helpful for students and moderators.

For DCP Aspect 1, encourage students to record qualitative data when it is clearly present. For example changes in the colour of indicators at the end point of a titration. Absolute uncertainties need to be incorporated into tables when quantitative data has been recorded.

1379 Experiments suitable for Design have potentially at least two independent variables that could be manipulated so that it is a meaningful decision to choose one of them.

Investigations requiring the consideration systematic errors are the most conducive to meeting the needs of CE Aspects two and three.

Please encourage students to record uncertainties in measurements for and then to consider their implication on derived numerical quantities in DCP. Please refer to the





School Singapore International School

Moderator: 003938

Subject: CHEMISTRY

Level: HL/SL

Component: PRACTICAL WORK

Internal assessment feedback form: group 4 (4/IAF)

NAME OF TEACHER(S)

P. Sandhu and R. Mahajan

A) COMMENTS TO TEACHER(S) ON SAMPLE WORK

Were the investigations/projects appropriate for the assessment of particular criteria? If NO, please complete section below

YES

Name of investigation(s) not suitable for assessing D and reasons why

Name of investigation(s) not suitable for assessing DCP and reasons why

Name of investigation(s) not suitable for assessing CE and reasons why

ADDITIONAL COMMENTS ON SECTION A

Only one independent variable should be selected by the student and its effect on a dependent variable should be monitored. Students had difficulty with the treatment of uncertainties and often failed to mention them at all.

Student work is moderated for Section A ONLY

B) COMMENTS TO TEACHER(S) ON THE PRACTICAL PROGRAMME

Was the practical programme of the correct duration (40hrs SL, 60hrs HL)?

YES

Was the syllabus coverage (Core, AHL, Options) appropriate?

NO

Was the sample of work of suitable complexity?

YES

Was there good coverage of ICT applications?

YES

ADDITIONAL COMMENTS ON SECTION B

The programme is interesting and includes some original and inventive investigations. Please note that experiments should be included for both of the options studied.

C) CLERICAL/PROCEDURAL

Was the form 4/PSOW submitted for each candidate completed correctly?

YES

Were the two highest levels for each criterion circled/highlighted on the form 4/PSOW for each sample candidate?

YES

Were written instructions or outlines of verbal instructions included?

YES

ADDITIONAL COMMENTS ON SECTION C

The written comments and use of cpn notation facilitated the moderation - thank you.

W

Alcohols & Carboxylic Acids

